



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,662	11/20/2003	Tomoyuki Akiyama	031281	7437
23850	7590	03/20/2006	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP			DIACOU, ARI M	
1725 K STREET, NW			ART UNIT	PAPER NUMBER
SUITE 1000				
WASHINGTON, DC 20006			3663	

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/716,662	AKIYAMA, TOMOYUKI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ari M. Diacou	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 24 February 2006.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-27 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 20 November 2003 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____.
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____.

## DETAILED ACTION

### ***Response to Arguments***

1. Applicant's arguments, see page 12 of the remarks, filed 2-24-2006, with respect to the drawings have been fully considered and are persuasive. The objection of the drawings has been withdrawn.
2. Applicant's arguments, see page 12-13 of the remarks, filed 2-24-2006, with respect to the rejection under 35 USC 112 have been fully considered and are persuasive. The rejections of claims 26-27 have been withdrawn.
3. Applicant's arguments towards the independent claims, see pages 13-15 of the remarks, filed 2-24-2006, with respect to the rejection(s) of the independent claims under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Dagenais and Uchizaki.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 1-3, 22, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais et al. (USP No. 7002733) in view of Uchizaki (USP No. 6646975). Dagenais discloses an optical repeater, comprising:

- a demultiplexer for dividing an inputted light into two components; [Fig. 6, #64]
- a multiplexer for coupling two components of a light separately outputted from said semiconductor optical amplifier. [Fig. 6, #67]

- two different SOAs amplifying different components of light [Fig. 6, #62 and #63]

but fails to disclose:

- a semiconductor optical amplifier having two separate inputs for inputting said two components of light outputted from said demultiplexer
- or a semiconductor optical amplifier including an active layer that has one type of structure selected from a group composed of a quantum dot, a quantum wire, a quantum dash, and a quantum well.

Uchizaki teaches a two different semiconductor optical amplifiers on the same substrate [Fig. 9] [Col. 14, lines 34-40] as well as the SOAs having a quantum well structure [Col. 14, lines 13-16]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to combine the SOAs 62 and 63 of Dagenais onto one substrate with two inputs in a way similar to Uchizaki, for the advantage of increased compactness.

8. Claim 8, 9, 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais et al. (USP No. 7002733). Dagenais discloses an optical repeater, comprising:

- a demultiplexer for dividing an inputted light into a TE wave and a TM wave; [Fig. 6, #64]
- a converter for converting the TM wave into a TE wave; [Fig. 6, #65]
- a multiplexer [Fig. 6, #67]

but fails to disclose:

- the multiplexer combining a TE wave with a TE wave
- or a semiconductor optical amplifier including an active layer that has one type of structure selected from a group composed of a quantum dot, a quantum wire, a quantum dash, and a quantum well.

In another embodiment, Dagenais teaches that an SOA may have a quantum well structure [Col. 5, line 23]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to remove the polarization rotator 66 if the application of module 60 did not require two polarizations to be output. It is well settled in case law that the removal of an unnecessary component is an obvious modification by those skilled in the art.

9. Regarding claims 2, 3 and 9, the parent claim being rejected over Dagenais or Dagenais in view of Uchizaki above, Dagenais further discloses dividing the inputted light into a TE and a TM wave.

10. Regarding claims 22-23, all gain equalizers and amplifiers inherently work in a limited range, and if manufactured by man-made processes, work in a limited predetermined range.

11. Regarding claims 26-27, all amplifying repeaters re-amplify the signal, and are therefore 1R repeaters.

12. Claims 6-7, 12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais or Dagenais in view of Uchizaki above, and further in view of Kinoshita et al. (USP No. 6023366). Dagenais and Uchizaki disclose the invention with all the limitations of claims 1 and 8, but fail to disclose ALC support structure.

Kinoshita teaches:

- an input detector for detecting an intensity of the inputted light; [Fig. 12, #146] [Col. 13, lines 49-55].
- a variable optical attenuator for attenuating a light outputted from said multiplexer; [Fig. 12, #156]
- an output detector for detecting an intensity of a light outputted from said variable optical attenuator; and [Fig. 12, #162] [Col. 13, lines 7-26]
- an output controller for controlling an intensity of an output signal by controlling operation of said variable optical attenuator based on the intensity detected by said output detector. [Fig. 12, #164] [Col. 13, lines 7-26]

Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to include an optical attenuator based ALC , for the advantage of increased control of the gain spectral profile. Regarding claim 6, Kim discloses

13. Claims 4-5, 10-11, 13-16, 18-21, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais in view of Uchizaki as applied to parent claims above, and further in view of Kim (and in the case of 12 and 17, further in view of

Kinoshita). Dagenais, Uchizaki and Kinoshita disclose the inventions with all the limitations of claims 1, 8, 12 and 17 above but do not teach monolithic integration of (de)multiplexer and SOA, Kim teaches the optical repeater wherein said demultiplexer and said multiplexer are monolithically integrated into a PLC with said semiconductor optical amplifier. [Fig. 4] [¶ 0022] Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to monolithically fabricate the multiplexer, demultiplexer and SOA, for the advantage of compact manufacture.

### ***Conclusion***

14. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

15. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

16. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 3/13/2006



JACK KEITH  
SUPERVISORY PATENT EXAMINER